

C L A I M S

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1. An electronic device manufacturing apparatus for manufacturing an electronic device, characterized by comprising:

gas removal means for removing a gas dissolved in a liquid containing a formation material of a member constituting the electronic device;

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droplet discharge means for discharging droplets of the liquid; and

means for controlling relative positions of said droplet discharge means and a substrate on which the electronic device is formed,

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wherein the droplets are applied to a predetermined position on the substrate.

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2. An electronic device manufacturing apparatus according to claim 1, characterized in that said gas removal means comprises a closed vessel filled with a membrane formed from a semi-transmitting film capable of transmitting a gas, and a vacuum unit for evacuating the closed vessel.

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3. An electronic device manufacturing apparatus according to claim 2, characterized in that said gas removal means comprises means for adjusting a flow rate of the liquid in the membrane.

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4. An electronic device manufacturing apparatus according to claim 1, characterized in that said gas removal means comprises means for detecting an amount of gas contained in the liquid.

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5. An electronic device manufacturing apparatus according to claim 1, characterized in that said gas removal means comprises a vacuum unit, and exposes a solution containing the liquid to vacuum.

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6. An electronic device manufacturing apparatus according to claim 5, characterized in that the vacuum unit has a variable exhaust speed.

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7. An electronic device manufacturing apparatus according to claim 5, characterized in that said gas removal means comprises means for detecting a vacuum degree of the vacuum unit.

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8. An electronic device manufacturing apparatus according to claim 1, characterized in that said droplet discharge means generates a bubble in the liquid using thermal energy, and discharges the liquid on the basis of generation of the bubble.

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9. An electronic device manufacturing apparatus according to claim 1, characterized in that said

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13. An electronic device manufacturing apparatus according to any one of claims 1 to 12, characterized in that the electronic device includes an electron source having a plurality of electron-emitting elements.

14. An electronic device manufacturing apparatus according to claim 13, characterized in that each electron-emitting element includes an electron-emitting element having a pair of conductors arranged at a gap.

15. An electronic device manufacturing apparatus according to claim 14, characterized in that said droplet discharge means includes means for discharging droplets of the liquid containing a formation material of the conductors.

16. An electronic device manufacturing apparatus according to claim 13, characterized in that the electron source includes an electron source having a plurality of electron-emitting element arrays each formed by connecting a plurality of electron-emitting elements between a pair of wiring lines.

17. An electronic device manufacturing apparatus according to claim 13, characterized in that the electron source includes an electron source constituted

by connecting a plurality of electron-emitting elements in a matrix by a plurality of row-direction wiring lines and a plurality of column-direction wiring lines.

5 18. An electron source substrate manufacturing apparatus for manufacturing an electron source substrate having a plurality of pairs of element electrodes formed on a substrate, conductive films each having an electron-emitting portion formed between each
10 pair of element electrodes, and a voltage application terminal to each element electrode, characterized by comprising:

gas removal means for removing a gas dissolved in a solution containing a metal element;

15 droplet discharge means for discharging droplets of the solution containing the metal element; and

means for controlling relative positions of said droplet discharge means and the substrate,

20 wherein the droplets are applied to a predetermined position on the substrate.

19. An electron source substrate manufacturing apparatus according to claim 18, characterized in that said gas removal means comprises a closed vessel filled
25 with a membrane formed from a semi-transmitting film capable of transmitting a gas, and a vacuum unit for evacuating the closed vessel.

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25. An electron source substrate manufacturing apparatus for manufacturing an electron source

substrate having a plurality of pairs of element electrodes formed on a substrate, conductive films each having an electron-emitting portion between each pair of element electrodes, and a voltage application terminal to each element electrode, characterized by comprising:

means for adjusting a temperature of a solution containing a metal element;

droplet discharge means for discharging droplets of the solution containing the metal element; and

means for controlling relative positions of said droplet discharge means and the substrate,

wherein the droplets are applied to a predetermined position on the substrate.

26. An electron source substrate manufacturing apparatus according to claim 18 or 25, characterized in that said droplet discharge means generates a bubble in the solution using thermal energy, and discharges the solution on the basis of generation of the bubble.

27. An electron source substrate manufacturing apparatus according to claim 18 or 25, characterized in that said droplet discharge means discharges the solution using kinematic energy.

28. An electron source substrate manufacturing

apparatus according to claim 18 or 25, characterized in that the solution containing the metal element contains a formation material of the conductive film in which the electron-emitting portion is formed.

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29. An electronic device manufacturing method characterized by comprising:

the gas removal step of removing a gas dissolved in a liquid containing a formation material of a member constituting an electronic device; and

the droplet discharge step of discharging droplets by droplet discharge means while controlling relative positions of the droplet discharge means for discharging droplets of the liquid and a substrate on which the electronic device is formed, thereby applying the droplets to a predetermined position on the substrate.

30. An electronic device manufacturing method according to claim 29, characterized in that the gas removal step comprises controlling a concentration of the gas dissolved in the liquid so as to be kept at a default value.

31. An electronic device manufacturing method according to claim 29, characterized in that the droplet discharge means generates a bubble in the

liquid using thermal energy, and discharges a solution on the basis of generation of the bubble.

5 32. An electronic device manufacturing method according to claim 29, characterized in that the droplet discharge means discharges the liquid using kinematic energy.

10 33. An electronic device manufacturing method characterized by comprising:

the temperature adjusting step of adjusting a temperature of a liquid containing a formation material of a member constituting an electronic device; and

15 the droplet discharge step of discharging droplets by droplet discharge means while controlling relative positions of the droplet discharge means for discharging droplets of the liquid and a substrate on which the electronic device is formed, thereby applying the droplets to a predetermined position on the
20 substrate.

25 34. An electronic device manufacturing method according to claim 33, characterized in that the droplet discharge means generates a bubble in the liquid using thermal energy, and discharges the liquid on the basis of generation of the bubble.

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40. An electronic device manufacturing method according to claim 36, characterized in that the electron source includes an electron source constituted by connecting a plurality of electron-emitting elements in a matrix by a plurality of row-direction wiring lines and a plurality of column-direction wiring lines.

41. An electron source substrate manufacturing method of manufacturing an electron source substrate having a plurality of pairs of element electrodes formed on a substrate, conductive films each having an electron-emitting portion formed between each pair of element electrodes, and a voltage application terminal to each element electrode, characterized by comprising:

the gas removal step of removing a gas dissolved in a solution containing a metal element; and

the droplet discharge step of discharging droplets by droplet discharge means while controlling relative positions of the substrate and the droplet discharge means for discharging droplets of the solution, thereby applying the droplets to a predetermined position on the substrate.

42. An electron source substrate manufacturing method according to claim 41, characterized in that the gas removal step comprises controlling a concentration of the gas dissolved in the solution so as to be kept

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applying the droplets to a predetermined position on the substrate.

46. An electron source substrate manufacturing method according to claim 45, characterized in that the droplet discharge means generates a bubble in the solution using thermal energy, and discharges the solution on the basis of generation of the bubble.

47. An electron source substrate manufacturing method according to claim 45, characterized in that the droplet discharge means discharges the solution using kinematic energy.

48. An electron source substrate manufacturing method according to claim 41 or 45, characterized in that the solution containing the metal element contains a formation material of the conductive film in which the electron-emitting portion is formed.

49. An image forming apparatus manufacturing method of manufacturing an image forming apparatus having an electron source substrate and a light-emitting member which emits light upon irradiation of electrons from the electron source substrate, characterized in that

the electron source substrate is manufactured by the method defined in claim 41 or 45.